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EXAMINER

DENNISON, JERRY B

ART UNIT PAPER NUMBER

2143

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/742,229

Applicant(s)

BESHA ET AL.

Examiner

J. Bret Dennison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-59 is/are rejected.
- 7) ☒ Claim(s) 60 and 61 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Action is in response to Amendment of Application Number 09/742,229 received on 14 July 2004.
2. Claims 1-35 have been canceled.
3. New claims 36-61 are presented for examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 48 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 48 recites "wherein said second controller distributes said selected addresses among said selected secondary queues so that a subset of said selected addresses belonging to any of said primary queues is distributed equitably among said selected secondary queues" which is unclear to Examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims ~~36-38~~ are rejected under 35 U.S.C. 102(e) as being anticipated by Merchant et al. (U.S. Patent Number 6,081,523).

5. Regarding claim 36 Merchant discloses at a source node, a method of data switching comprising:

receiving data segments, each of said data segments belonging to a data stream from among a plurality of data streams (Merchant, col. 4, lines 10-15);

writing said each of said data segments in a payload memory device (Merchant, col. 4, lines 15-20):

selecting a particular data stream from among said data streams for transmission by said source node and if there is at least one data segment in said payload memory device belonging to said particular data stream:

assigning to said particular data stream a current output channel from among a plurality of output channels, said current output channel being selected to provide equitable distribution of said particular data stream across the plurality of output channels (Merchant, col. 4, lines 25-35, col. 7, lines 25-30, Merchant discloses dividing a data stream into evenly distributed segments and outputting each data segment onto a selected media independent interface for transmission on the corresponding media interface link);

enqueueing a selected data segment belonging to said particular data stream in a buffer associated with said current output channel (Merchant, col. 5, lines 10-15, Merchant discloses that the media independent interface control has a separate addressing control logic enabling random access to the stored data in the transmit buffer); and

transmitting said selected data segment over said current output channel (Merchant, col. 5, lines 15-28).

Claims 52-55 and 57 are rejected under 35 U.S.C. 102(e) as being anticipated by Rotolo et al. (U.S. Patent Number 6,542,268).

6. Regarding claim 52, Rotolo discloses a network comprising:
- a plurality of source nodes (Rotolo, col. 9, lines 25-35, Fig 9a, Input WDM Stage);
 - a first plurality of cross connectors (Rotolo, col. 9, lines 25-35, Fig 9a, Optical Interconnections);
 - a plurality of core nodes (Rotolo, col. 9, lines 25-35, Fig 9a, Filtering Stage);
 - a second plurality of cross connectors (Rotolo, col. 9, lines 25-35, Fig 9b, Optical Interconnections);
 - a plurality of sink nodes (Rotolo, col. 9, lines 25-35, Fig 9b, Output WDM Stage);
- and
- a plurality of multi-channel links connecting said source nodes to said first plurality of cross connectors (Rotolo, Fig 9a, 1.1, 2.1), said first plurality of cross

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connectors to said core nodes (Rotolo, Fig 9a, Xin1.1), said core nodes to said second plurality of cross connectors (Rotolo, Fig 9b, Sout.1.1), and said second plurality of cross connectors to said sink nodes (Rotolo, Fig 9b, Xout):

wherein said first plurality of cross connectors is configurable to provide multi-channel paths from each of said source nodes to at least one of said core nodes; and wherein each of said source nodes sends data streams to at least one of said sink nodes and regulates the bit rate of each of said data streams (Rotolo, Fig 9b, Optical Interconnections, col. 1, lines 30-40, Rotolo teaches filters and switches which regulate the bandwidth); and

wherein each of said source nodes divides data of each of said data streams equitably among channels of a selected multi-channel path (Rotolo, col. 7, lines 30-45, Rotolo teaches dividing the entering WDM signal in N identical WDM output signals).

7. Regarding claim 53, Rotolo discloses the limitations, substantially as claimed, as described in claim 52, including wherein at least one of said core nodes includes a plurality of parallel switch planes, each of said switch planes connecting to a single channel from each of a selected subset of said multi-channel paths (Rotolo, Fig. 13a, 1x2 Opt. Sel. 2x1, Opt. Sel.).

8. Regarding claim 54, Rotolo discloses the limitations, substantially as claimed, as described in claim 53, including wherein said second plurality of cross connectors is

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configurable to provide multi-channel paths from each of said core nodes to at least one of said sink nodes (Rotolo, Fig 9b, Xout1.1).

9. Regarding claim 55, Rotolo discloses the limitations, substantially as claimed, as described in claim 52, including at least one multi-channel link directly connecting at least one of said source nodes to at least one of said core nodes, thereby bypassing said first plurality of cross connectors (Rotolo, Fig. 91, Rotolo teaches a multi-channel link from Sout1.1 directly connected to Xout1.1).

10. Regarding claim 57, Rotolo discloses the limitations, substantially as claimed, as described in claim 53, including wherein at least one of said switch planes includes an optical switch (Rotolo, col. 20, lines 55-60).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 39-41 rejected under 35 U.S.C. 103(a) as being unpatentable over Merchant et al. (U.S. Patent Number 6,081,523) in view of Rochberger et al. (U.S. Patent Number 6,577,653).

11. Regarding claims 39-41, Merchant discloses the limitations, substantially as claimed, as described in claim 36. Merchant also discloses load balancing across the channels, enabling traffic load on the channels to be evenly balanced (Merchant, col. 7, lines 25-30). However, Merchant does not explicitly state wherein said current output channel has a logical relationship to said previous output channel, the logical relationship being an adjacency relationship and wherein said current output channel and said previous output channel are specific to said particular data stream. In an analogous art, Rochberger discloses an apparatus for establishing a route utilizing multiple parallel segments where a particular data stream is broken up into segments and transmitted in a round robin fashion between all parallel paths (Rochberger, col. 12, line 54 through col. 13, line 3). Because, transmission is performed in a round robin fashion, the current output channel depends on the previous output channel. Therefore it would have been obvious to one in the ordinary skill in the art to combine Merchant's arrangement for transmitting packet data segments with Rochberger to establish a connection between a source and destination node using multiple parallel paths, where bandwidth capacity on the multiple paths are aggregated and combined to form a route having a bandwidth larger than any single path (Rochberger, col. 6, lines 55-67).

Claims 37, 38, and 42-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Merchant et al. (U.S. Patent Number 6,081,523) in view of Irwin et al. (U.S. Patent Number 5,841,771).

12. Regarding claims 37 and 38, Merchant discloses the limitations, substantially as claimed, as described in claim 36. However Merchant does not explicitly state including wherein said step of selection said particular data stream is based on a bit-rate allocation according to a process of admission-control of each of said data streams. In an analogous art, Irwin discloses selection of data streams based on bit-rate allocation (Irwin, col. 3, lines 55-67).

13. Regarding claim 42, Merchant discloses the limitations, substantially as claimed, as described in claim 36. Merchant also discloses providing service functions to distribute traffic (Merchant, col. 3, lines 50-65). However, Merchant does not explicitly state associating each of said data streams in said plurality of data streams with a sink node from among a plurality of sink nodes. In an analogous art of data switching, Irwin discloses a system including queuing buffers used to receive incoming cells for transmission (Irwin, col. 11, lines 45-67). Therefore it would have been obvious to one in the ordinary skill in the art at the time of the invention to incorporate the plurality of input ports of Irwin into the system of Merchant to allow for receiving and buffering cells from a multiplicity of sources for subsequent orderly transport to their destination ports (Irwin, col. 4, lines 1-8).

14. Regarding claim 43, Merchant discloses a source node comprising:
a plurality of input ports (Merchant, col. 4, lines 10-25);
a plurality of output ports (Fig. 1, 28b);

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a payload memory device for storing data segments received from a plurality of input ports each of said data segments associated with one of a plurality of predefined data streams (Merchant, col. 4, lines 10-25, 50-60);

a second memory device logically partitioned into secondary queues, each of said secondary queues associated with an output port from among said plurality of output ports (Merchant, col. 4, lines 45-60); and

a first controller for regulating transfer of selected addresses from said primary queues to said second memory device; and (Merchant, col. 4, lines 10-35).

However, Merchant does not explicitly state having:

a first memory device logically partitioned into primary queues, each of said primary queues associated with one of said predefined data streams and holding addresses in said payload memory of data segments belonging to said one of said predefined data streams;

a second controller for equitably distributing said selected addresses among selected a secondary queues

In an analogous art of data switching, Irwin discloses a common memory partitioned to provide queuing buffers for holding incoming data streams (Irwin, col. 11, lines 45-55) and holding address information in payload memory (col. 11, lines 55-67). Therefore it would have been obvious to one in the ordinary skill in the art at the time of the invention to incorporate the plurality of input ports of Irwin into the system of Merchant to allow for receiving and buffering cells from a multiplicity of sources for subsequent orderly transport to their destination ports (Irwin, col. 4, lines 1-8).

15. Regarding claim 44, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein each of said secondary queues is associated with an output port from among said plurality of output ports (Irwin, col. 4, lines 1-8).

16. Regarding claim 45, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein said payload memory device is a common-memory device operable to store data segments belonging to each of said predefined data streams (Irwin, col. 4, lines 1-8).

17. Regarding claim 46, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein said first controller is a service-rate controller operable to:

receive bit-rate allocations, one bit- rate allocations for each of said predefined data streams, from a service-quality controller performing a function of admission control of said predefined data streams (Irwin, col. 3, lines 35-50);

select a particular primary queue from among said primary queues based on said bit-rate allocations (Irwin, col. 3, last paragraph); and

determine and instant time for transferring a data segment from said particular primary queue (Irwin, col. 4, lines 5-25). See motivation for claim 43.

18. Regarding claim 47, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein said service-quality controller frequently updates said bit-rate allocations for said predefined data streams (Irwin, col. 14, lines 1-42).

19. Regarding claim 48, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein said second controller distributes said selected addresses among said selected secondary queues so that a subset of said selected addresses belonging to any of said primary queues is distributed equitably among said selected secondary queues (Irwin, col. 11, last paragraph).

Regarding claim 49, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including wherein said second controller is operable to:

associate a current secondary queue from among said plurality of secondary queues with each primary queue in said plurality of primary queues (Irwin, col. 11, lines 45-67); and

update said current secondary queue associated with said each primary queue when a data segment is transferred from said each primary queue (Irwin, col. 11, last paragraph).

20. Regarding claim 50, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 44, including wherein each of output ports associated with said selected secondary queues transmit signals over a wavelength channel in a wavelength-division-multiplexed link (Irwin, col. 12, lines 1-35).

21. Regarding claim 51, Merchant and Irwin disclose the limitations, substantially as claimed, as described in claim 43, including an output interface for transmitting data segments from said payload memory device over said wavelength-division-multiplexed link, said particular data segments determined by addresses in said selected secondary queues (Irwin, col. 12, lines 1-35).

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rotolo in view of Grow (U.S. Patent Number 6,629,147).

22. Regarding claim 56, Rotolo discloses the limitations, substantially as claimed, as described in claim 53. However, Rotolo does not explicitly state wherein each of said switch planes has its own scheduler for scheduling transfer of data across said each of said switch planes. In an analogous art, Grow discloses a system for segmentation and reassembly of data segments including logic for scheduling transmission of the data segments (Grow, col. 12, lines 45-55). Therefore it would have been obvious to one in the ordinary skill in the art at the time of the invention to incorporate the scheduling logic

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of Grow into Rotolo to provide a switching fabric architecture which can be scaled to incorporate additional numbers of input and output ports without a corresponding geometric increase in a number of integrated circuits required for transmitting frames from the input ports to the output ports (Grow, col. 1, lines 45-50).

Claims 58 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grow (U.S. Patent Number 6,629,147) in view of Aicklen (U.S. Patent Application Publication Number 2003/0067653).

23. Regarding claims 58 and 59, Grow discloses a source node having a plurality of multi-channel links connecting to core nodes in a network, each of said links comprising a respective plurality of channels, including:

- receive a data unit belonging to a particular data stream (Grow, col. 5, lines 5-10);

- select a particular multi-channel link from among said plurality of multi-channel links according to a desired distribution of data streams over the plurality of multi-channel links (Grow, col. 5, lines 10-20);

- transmit said data unit over a particular channel in said particular multi-channel link, said particular channel bearing a logical relationship to said particular last-used channel (Grow, col. 5, lines 10-20, Grow teaches a round robin technique to choose output ports, where the current channel depends on the last-used channel).

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Grow also discloses that the transmission of data cells for subsequent new data frames may be scheduled according to a round robin scheme implemented by the output ports (Grow, col. 5, lines 10-15). In order to implement the round robin scheme, an identification of some sort must be kept in some form of memory, i.e. a table, to select ports for transmission in a round robin order.

However, Grow does not explicitly state wherein said source node operable to:

retain, in a control table, an identifier of a last-used channel in each of said multi-channel links for each data stream from among a plurality of data streams originating from said source node;

ascertain, using said control table, a particular last-used channel by said particular data stream in said particular multi-channel link ;

In an analogous art, Aicklen discloses a table for a round robin scheme to control data transmission (Aicklen, page 3, paragraph 30). Therefore it would have been obvious to one in the ordinary skill in the art at the time of the invention to incorporate the control table of Aicklen into Grow for the benefit of decreasing underutilization of links in an optical router or switch (Aicklen, page 1, paragraph 10).

Allowable Subject Matter

Claims 60 and 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

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Applicant's arguments with respect to claims 36-61 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Bret Dennison whose telephone number is (571)272-3910. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A Wiley can be reached on (703)308-5221. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

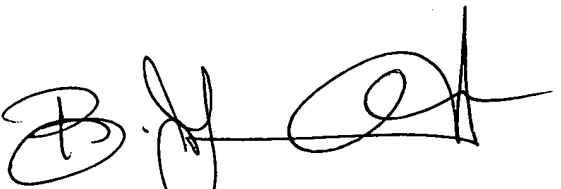
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